

# EUROPEAN PATENT OFFICE

## Patent Abstracts of Japan

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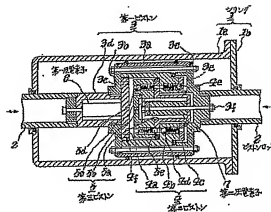
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APPLICANT : TOKAI UNIV;

INVENTOR : KOGANEZAWA KOICHI;

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TITLE : PIEZOELECTRIC-HYDRAULIC HYBRID ACTUATOR

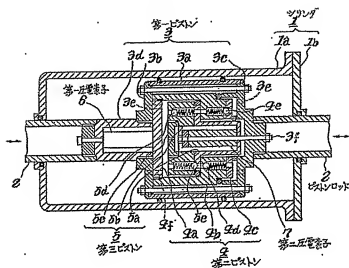


ABSTRACT : PURPOSE: To provide an actuator which actuates a piston linearly without using any hydraulic equipment such as an electric motor or a hydraulic pump.

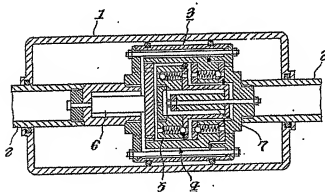
CONSTITUTION: A piezoelectric-hydraulic hybrid actuator is constructed of the first piston 3 consisting of the first and the second end plates 3b, 3c respectively provided with a piston rod 2 penetrating both ends of a cylinder 1 under an oil-tight condition and an intermediate cylindrical body 3a, the second piston 4 connected to the first end plate 3b side by means of the first piezoelectric element 6 in the inside of the first piston 3, and the third piston 5 connected to the second end plate 3c in the first piston 3 by means of the second piezoelectric element 7 in the inside of the second piston 4. In the second and the third pistons 4, 5, check valves 4d, 4e and 4f, 4g, 4h, 4i, 4j, 4k, 4l, 4m, 4n, 4o, 4p, 4q, 4r, 4s, 4t, 4u, 4v, 4w, 4x, 4y, 4z, which allow the flow in the opposite directions mutually, are arranged oil is filled in the inside space of the cylinder 1.

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【図1】



【図2】



【図3】

